Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

The equation of the curve of this system passing through $(0, n)$ is then

$$x\sqrt{1+x^2} + y\sqrt{1+y^2} - n\sqrt{1+n^2} + 2nxy + \log\left[\frac{(x+\sqrt{1+x^2})(y+\sqrt{1+y^2})}{n+\sqrt{1+n^2}}\right] = 0. \tag{3}$$

Solving the equation of the conic for x we have

$$x = -y\sqrt{1+n^2} \pm n\sqrt{1+y^2}.$$

These values of x satisfy (3); hence, the conic must be a part of the curve represented by (3).

362. Proposed by C. N. SCHMALL, New York City.

Having given $y^3 - a^2y + axy - x^3 = 0$, show by Maclaurin's theorem that

$$y = -\frac{x^3}{a^2} - \frac{x^4}{a^3} - \frac{x^5}{a^4} - \cdots,$$

SOLUTION BY A. M. HARDING, University of Arkansas.

We obtain by successive differentiation

$$(3y^2 - a^2 + ax)\frac{dy}{dx} - 3x^2 + ay = 0,$$

$$(3y^2 - a^2 + ax)\frac{d^2y}{dx^2} + 6y\left(\frac{dy}{dx}\right)^2 + 2a\frac{dy}{dx} - 6x = 0,$$

$$(3y^2 - a^2 + ax)\frac{d^3y}{dx^3} + 18y\frac{d^2y}{dx^2}\frac{dy}{dx} + 6\left(\frac{dy}{dx}\right)^3 + 3a\frac{d^2y}{dx^2} - 6 = 0,$$

$$(3y^2 - a^2 + ax)\frac{d^4y}{dx^4} + 24y\frac{d^3y}{dx^3}\frac{dy}{dx} + 18y\left(\frac{d^2y}{dx^2}\right)^2 + 36\frac{d^2y}{dx^2}\left(\frac{dy}{dx}\right)^2 + 4a\frac{d^3y}{dx^3} = 0,$$

$$(3y^2 - a^2 + ax)\frac{d^5y}{dx^5} + 30y\frac{d^4y}{dx^4}\frac{dy}{dx} + 60y\frac{d^3y}{dx^3}\frac{d^2y}{dx^2} + 60\frac{d^3y}{dx^3}\left(\frac{dy}{dx}\right)^2 + 90\left(\frac{d^2y}{dx^2}\right)^2\frac{dy}{dx} + 5a\frac{d^4y}{dx^4} = 0.$$

When $x = 0$, $y = 0$, a, or $-a$. Choosing the first value of y, we obtain

$$\frac{dy}{dx} = 0, \quad \frac{d^2y}{dx^2} = 0, \quad \frac{d^3y}{dx^3} = -\frac{6}{a^2}, \quad \frac{d^4y}{dx^4} = -\frac{24}{a^3}, \quad \frac{d^5y}{dx^5} = -\frac{120}{a^4}.$$

Hence,

$$y = -\frac{6}{a^2}\frac{x^3}{3!} - \frac{24}{a^3}\frac{x^4}{4!} - \frac{120}{a^4}\frac{x^5}{5!} - \cdots$$

$$= -\frac{x^3}{a^2} - \frac{x^4}{a^3} - \frac{x^5}{a^4} - \cdots.$$

Also solved by PAUL CAPRON and GEO. W. HARTWELL.